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EMPLOYMENT OPPORTUNITIES AND USABLE AGRICULTURAL SKILLS IN NON-FARM AGRICULTURAL OCCUPATIONS IN APPALACHIA. EXECUTIVE REPORT.

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DESCRIPTORS- *EMPLOYMENT OPPORTUNITIES, *AGRICULTURAL SKILLS, *EDUCATIONAL NEEDS, *OFF FARM AGRICULTURAL OCCUPATIONS, AGRICULTURAL TECHNICIANS, OCCUPATIONAL SURVEYS, AGRICULTURAL EDUCATION, *OCCUPATIONAL CLUSTERS, OHIO, KENTUCKY,

EMPLOYMENT OPPORTUNITIES AND AGRICULTURAL COMPETENCIES NEEDED BY WORKERS IN 28 KENTUCKY AND 10 OHIO COUNTIES OF THE APPALACHIAN REGION WERE STUDIED (1) TO DETERMINE THE NEED FOR POST-HIGH SCHOOL EDUCATIONAL PROGRAMS AND PROCEDURES FOR IMPLEMENTING THEM, AND (2) TO PREPARE FOR ESTABLISHING AND EVALUATING PILOT PROGRAMS AT THE HIGH SCHOOL AND POST-HIGH SCHOOL LEVELS. TRAINED INTERVIEWERS, USING A THREE-PART INSTRUMENT CONTAINING 92 ITEMS GATHERED DATA IN 736 JOB POSITIONS IN 267 JOB TITLES IN 284 AGRICULTURAL BUSINESSES SELECTED BY RANDOM SAMPLING AND STRATIFICATION TECHNIQUES FROM TELEPHONE EXCHANGE INFORMATION. OF THESE, 306 JOBS IN 126 TITLES WERE CLASSIFIED AS AGRICULTURAL, AND 67 TITLES WERE DEFINED AS BEING AT THE TECHNICIAN LEVEL. ESTIMATES INDICATED THAT THERE WERE 122,440 WORKERS IN THE REGION, OF WHICH 11,752 WERE AGRICULTURAL WORKERS IN 4,531 BUSINESSES. AT LEAST 500 BUT NOT MORE THAN 2,400 NEW AGRICULTURAL TECHNICIANS WOULD BE NEEDED ANNUALLY IN THE REGION. ON-THE-JOB TRAINING OF TECHNICIANS WAS PREVALENT ALTHOUGH EMPLOYERS WOULD RATHER HIRE AND PAY HIGHER WAGES TO TRAINED WORKERS. FACTOR ANALYSIS OF DATA REVEALED 15 CLUSTERS OF AGRICULTURE AND BUSINESS COMPETENCIES AND 10 GROUPINGS OF JOBS WITH 3 TO 15 COMMON COMPETENCY REQUIREMENTS. RECOMMENDATIONS CONCERNED WAYS IN WHICH THE COMPETENCY CLUSTERS AND JOB GROUPINGS SHOULD BE USED IN DEVELOPING CURRICULUMS, AND THE NEED FOR DEVELOPING NEW VOCATIONAL AND TECHNICAL PROGRAMS IN APPALACHIA. THIS IS AN ABRIDGED VERSION OF THE FINAL REPORT, ED 010 496. (JM)

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EXECUTIVE REPORT

NOVEMBER, 1966

by

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MOREHEAD STATE UNIVERSITY

MOREHEAD, KENTUCKY

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EMPLOYMENT OPPORTUNITIES AND USABLE AGRICULTURAL SKILLS IN NON-FARM AGRICULTURAL OCCUPATIONS IN APPALACHIA

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FOREWARD

This publication has been prepared to provide vocational and technical teachers, researchers, counselors, curriculum planners, and other interested persons with an abridged version of the original research report. The study, while concerning vocational and technical education in agriculture, has implications in all fields of vocational and technical education.

The research was global in nature, with the major objective of identification of employment opportunities and educational needs of workers in present and emerging non-farm agricultural jobs in twenty-eight eastern Kentucky counties and ten southern Ohio counties.

From these data, it was also determined:

1. How the activities used and knowledges needed by workers cluster together in general courses which may be offered.

2. How the identified job titles cluster together for training, based on the workers' responses concerning how the activities and knowledges were used in their jobs.

Special emphasis was placed on determining the general post-high school educational courses needed to prepare workers to enter or progress in agricultural vocational and technical level positions.

The authors wish to express their appreciation to the four Special Consultants for the study:

Dr. Lloyd J. Phipps, Chairman, Agricultural Education, Vocational and Technical Education Department, College of Education, University of Illinois, Urbana, Illinois
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EMPLOYMENT OPPORTUNITIES AND USABLE AGRICULTURAL SKILLS[1] IN NON-FARM AGRICULTURAL OCCUPATIONS IN APPALACHIA

Statement of the Problem

This study was undertaken in order to determine the employment opportunities and agricultural competencies needed by workers in present and emerging non-farm agricultural occupations in a thirty-eight county area in the Appalachian region. The specific objectives of the study were:

1. To identify the present and emerging jobs in industries and businesses that serve agriculture in selected counties in the Appalachian region.

2. To determine the employment opportunities for the jobs identified.

3. To determine competencies required for a selected number of these jobs.

4. To determine the needed additional post-high school educational programs to prepare workers to enter or progress in these jobs.

5. To determine feasible procedures for implementing the development of educational programs at the post-high school level, for selected clusters of occupations where the data collected indicated that programs are needed.

6. To prepare the way for establishing and evaluating pilot programs at the high school level and at the post-high school level.

Definition of the Problem

Need for the Study

Information obtained from available literature indicated the following trends:

1. In recent years there has been an increasing shortage of trained workers and the need for strengthening certain phases of education. One of the areas of greatest need for trained workers and improved training is the area of vocational and technical education.

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[1] Dillon, Roy D. and Cain, Paul C. "Employment Opportunities and Usable Agricultural Skills in Non-Farm Agricultural Occupations in Appalachia", Staff Study, School of Applied Sciences and Technology, Morehead State University, Morehead, Kentucky, November, 1966. 174 pp.

2. In vocational-technical education, several global studies have been completed to determine employment opportunities and abilities needed by workers in non-farm agricultural jobs. These studies indicate that: (1) jobs can be identified by analyzing what the worker does, (2) much technical education belongs at the post-high school level because of the difficulty and complexity of the instruction and the maturity of the student. (1)(4)(5)(6)(7)(8)(9)(10)(11)(12)(14)(15)(16)(19)(26)(27)(28)

3. According to the United States Department of Agriculture Economic Research Service, attention needs to be focused on special problems to prepare farm and other youth for productive non-farm agricultural careers. Present data from the Kentucky Department of Commerce indicates that the job titles listed in the counties selected deal only with jobs in production agriculture. The Kentucky Bureau of Economic Security indicates that if attention is focused on the employment opportunities in non-farm agricultural jobs, the out-mobility of rural residents should decrease(3). This would strenghten the Kentucky program of agricultural expansion, which includes new goals for production agriculture and in jobs associated with agriculture. According to the 1960 Census of Population, median family income in one-half of the proposed counties in eastern Kentucky was $1,056 to $2,708 yearly, and from $2,708 to $3,516 for the remaining one-half of the proposed counties in Kentucky(2).

4. Statewide studies completed concerning present and future workers needing agricultural competencies also indicate that:

   a) Almost one-half of all workers employed in off-farm agricultural businesses need some knowledge or skills in agriculture.

   b) There was an estimated median increase of four per cent per year in the number of workers needing agricultural competencies.

   c) Hiring of replacement workers is largest in businesses that have the most part-time workers.

   d) Vocational agriculture may support, or be supported by, other vocational and technical subjects taught in the comprehensive high school and post-high school institutions.

   e) Employers seem unwilling to hire employees under about 20 years of age. Additional education beyond high school seems logical in order to fill the gap.

   f) Employers have not had the experience of hiring beginning employees with post-high school education required. In states where a higher amount of technical education above high school is being provided, the per cent of employers requiring this type experience is greater.

   g) There will be an increase in the hiring of persons with more than a high school education for entry level positions.

h) Advancement within an occupation required a higher average level of competency than was required to gain intitial entry.

i) It is possible to determine the competencies needed for entry and advancement, and to group these competencies into clusters so that common and specialized courses may be offered for groups of jobs having similiar educational requirements. (17)(18)(24)

The Procedure for Conducting the Study

The Major Tasks in Conducting the Study

The study involved six major tasks:

1. The development of a questionnarire in order to obtain information about: (1) the functions of each firm, the kinds and numbers of workers in present and anticipated job titles in the firm, (2) the specific activities in which workers engage, and (3) the knowledges workers use in their jobs.

2. The training of an interview team, and the interviewing of a selected sample of 284 business firms in the thirty-eight county region of study.

3. The mathematical projections of the data to determine:

   a) the total number of workers currently employed.

   b) the total number of workers currently employed in agriculturally oriented jobs.

   c) the total number of agricultural technicians currently employed.

   d) the functions of businesses studied.

   e) the additional number of agricultural technicians needed in the next 3 and 5 year period.

   f) the educational requirements, work experience requirements, and age limitations for agricultural technician jobs on which data were gathered.

4. The determination of principal-axis factors for 92 activity and knowledge variables, using the data for 306 identified agriculturally-oriented job positions.

5. The determination of principal-axis factors for 126 different agriculturally-oriented job titles, based upon the workers' responses concerning activities and knowledges used in their jobs.

6. The determination of principal-axis factors for 92 activity and knowledge variables, within each of ten identified job-title clusters.

The Instrument

The instrument used in the study contained three forms. The purpose of each was:

Form 1: To obtain information about the functions of each firm, the kinds and numbers of workers in present and anticipated job titles in the firm.

Form 2: To obtain information about specific jobs in each firm; specifically the activities in which the worker engages, and the knowledges he uses in his job.

Form 3: To obtain a narrative description of the job, and a determination of the level of the job, i.e., laborer, semi-skilled, skilled,technical,semi-professional,professional.

At the time each employer who was interviewed furnished information about present and future employees in each job title in the business, a checklist of activities and knowledges was completed separately for each job title. For each item on the checklist (a total of 92 items) the employer noted the degree to which the worker performed the activity or used the knowledge in his job, on a three point scale:

0 = Does not perform the activity or utilize the knowledge in his job.

1 = Performs the activity or utilizes the knowledge "some" or "little" in his job.

2 = Performs the activity or utilizes the knowledge "much" or "often" in his job.

Care was taken to build an instrument which was readable, concise, and which could be administered. Before the instrument was used in the field, it was administered on a trail basis to determine whether the forms were satisfactory for use in the study. A copy of the instrument is included as Appendix A. A list of the 92 activity and knowledge variables is included as Appendix B.

The Selection of the Sample

1. The region of study, or universe, was designated as a thirty-eight county area; twenty-eight eastern Kentucky counties and ten southern Ohio counties, including the service region of Morehead State University. The counties were:

Kentucky			Ohio
Bath	Greenup	Menifee	Adams
Bourbon	Harrison	Montgomery	Brown
Boyd	Johnson	Morgan	Cleremont
Bracken	Knott	Nicholas	Gallatin
Breathitt	Lawrence	Pendelton	Highland
Carter	Lewis	Perry	Jackson
Elliott	Magoffin	Pike	Lawrence
Fleming	Martin	Robertson	Meigs
Floyd	Mason	Rowan	Pike
		Wolfe	Scioto

2. In order to obtain the final list of businesses to be interviewed a two-stage random-sampling technique with two-way stratification was used. The decision was made to obtain the names of businesses to be interviewed from the yellow pages of the telephone directories published by the telephone exchanges serving the area to be studied.

3. The names of all the telephone companies serving the thirty-eight county region of study was obtained from the State Department of Commerce in Kentucky and Ohio. The names of all the telephone exchanges serving the thirty-eight county area were then obtained from each telephone company. The 159 telephone exchanges included all the land area in the geographical region of study. The 159 exchanges were then grouped into three strata based on the population of the largest city or town served by the exchange. This procedure was used to insure a final sample which was representative of the types of firms found in rural, suburban, and city areas. A stratified random sample of forty-one telephone exchanges was then selected, as shown in Table 1. The table of random numbers was used for the selection.

TABLE 1

SAMPLE OF TELEPHONE EXCHANGES IN THE THIRTY-EIGHT COUNTY REGION OF STUDY

Population Stratum	No. of Telephone Exchanges in 38 County Area	No. of Telephone Exchanges in the Sample
0-1000	95	25% or 24
1000-5000	49	25% or 12
5000-over	15	30% or 5
Total	159	41

4. The names of all businesses in the forty-one telephone exchanges in the sample were then obtained from the yellow page listings of the forty-one telephone directories. The listings of businesses from each exchange was done within the population stratum from which it came, and this identity was retained for the remainder of the sampling. A 50 per cent sample of all businesses listed was drawn by taking a 50 per cent sample from each telephone exchange within each of the three strata. This procedure was used to insure proportionate representation from each of the exchanges within each population stratum in the final sample, since the number of businesses in each telephone exchange and within each stratum were not equal. All sampling was done by use of the random numbers table. Table 2 shows the data for this step.

TABLE 2

NUMBER OF BUSINESS FIRMS IN THE FIFTY-PER CENT RANDOM SAMPLE IN THREE POPULATION STRATA

Population Stratum	Total No. of Businesses	Per Cent Sampled	Number of Businesses in Sample Drawn
0-1000	625	50	313
1000-5000	1366	50	683
5000-over	2754	50	1377
TOTAL	4745		2373

5. The 2,373 businesses retained in tne 50 per cent sample were divided into three categories based on the business title and yellow page heading, by stratum. The 3 categories were:

"Code 1" Non-farm agricultural businesses: defined as businesses which are agriculturally oriented, and are operationally defined as businesses that:

a) Produce products used in the production of many celled plants and animals.

b) Provide services relating to the production of many celled plants and animals.

c) Conduct research relating to the production of many celled plants and animals.

d) Provide services relating middleman activities between production and processing.

e) Serve the needs unique to the producers of many celled plants and animals, and the workers in other agricultural businesses.

"Code 2" Non-agricultural businesses: defined as businesses which do not appear agriculturally oriented, but are operationally defined as businesses that may have workers in positions requiring knowledge usually taught formally relating to: plant science, animal science and dairy science, economics of agriculture, engineering and mechanics of agriculture, agricultural education, rural sociology, horticulture, floriculture, soils, food and dairy technology, forestry, and landscape architecture.

"Code 3" Those businesses not included in the above and deemed not to employ any persons requiring agricultural knowledge and skills.

6. Those businesses in category "1", non-farm agricultural businesses, were further categorized into one of seven types of business to insure a cross-sectional representation of different types of non-farm agricultural businesses in the final sample. The agricultural businesses were categorized as follows:

   a) Horticulture
   b) Livestock
   c) Crops and Soils
   d) Agricultural Education
   e) Agricultural Economics
   f) Agricultural Engineering
   g) Poultry

7. A 70 per cent sample was drawn in each of the seven types of sub-categories in code "1", non-farm agricultural businesses. In businesses category "2" a 10 per cent sample was drawn of the non-farm agricultural businesses with possibilities.

8. The 50 per cent random sample of "Code 3" or non-agricultural businesses was put aside at this point, for a later study.

9. A total of 141 category (1)"non-farm agricultural businesses" and 143 category (2)"non-agricultural businesses with possibilities for agriculturally trained personnel", were interviewed. This was a total of 284 firms.

The Collection of the Data

A nine member research assistant team was trained in the Morehead area, interviewing pilot businesses selected from the Morehead telephone exchange. The research team also met with the special consultants on the study to discuss and practice approved interview techniques and procedures.

Beginning November 1, 1965, the field data were collected by the research assistant team, who made personal contacts with each of the 284 business firms in the final random sample. A total of 15,414 miles were driven by the interviewers during this phase of the project.

After the data were obtained, the raw-data forms were carefully coded and checked. All the data were then punched onto IBM cards by the research assistant staff. The cards were visually verified and a card sort was made, by column, on all decks to insure that the correct coding procedure had been used. The data for the 736 job positions identified were carefully evaluated by the project staff. Using the data obtained on each job position, the raw data form was given a descriptive title which best reflected the worker's function. An additional purpose was to consolidate titles for more effective data analysis purposes.

The Analysis of the Data

Identification of Present and Emerging Jobs

Data were obtained on a total of 736 job positions in the 284 businesses in the sample. These 736 job positions represented 267 different descriptive job titles.

Of the 736 job positions, 30% job positions were defined as agriculturally oriented jobs, and represented 126 different vocational and technical job titles. Of the 126 different agriculturally-oriented job titles, 67 titles were defined as agricultural-technician job titles.

Employment and Employment Opportunities for Agricultural Workers Identified

A. Total Number of Workers Currently Employed.

Estimates of total number of workers indicate that there were 122,440 workers employed in business firms in the thirty-eight county region of study. This estimate pertains to workers employed in Type 1 and Type 2 businesses only. Workers in agricultural businesses(Type 1) constitute about 10 per cent of the total workers,with 71.1 per cent of the agricultural workers employed in Type 2 firms.

Of the 284 business firms contacted, 146 firms had one or more jobs requiring the use of agricultural knowledge and skills. It was estimated that 4531 businesses in the region of study employ agricultural workers.

Table 3 emphasizes the importance of the Type 2 businesses as a source of employment for workers who use specialized agricultural knowledge and skills. Estimates indicate that 80 per cent of the businesses in the universe which employ workers needing agricultural knowledge and skills were Type 2 businesses.

TABLE 3

ESTIMATES OF THE TOTAL NUMBER OF BUSINESS FIRMS HAVING WORKERS WHO REQUIRE VOCATIONAL AND TECHNICAL AGRICULTURAL EDUCATION, IN THE THIRTY-EIGHT COUNTY REGION OF STUDY

Population Stratum and Type of Business	Number of Workers In Sample	In Universe	Per Cent
Strata 1			
Type 1	24	244	5.4
Type 2	7	560	12.4
	31	804	
Strata 2			
Type 1	29	324	7.1
Type 2	16	1280	28.3
	45	1604	
Strata 3			
Type 1	44	390	8.6
Type 2	26	1733	38.2
	70	2123	
TOTALS	146	4531	100.0

B. Number of Workers Currently Employed in Agriculturally-Oriented Jobs.

It was estimated that there were 11,752 persons employed in agriculturally-oriented jobs in the region of study. These workers were defined as needing agricultural knowledge and skills at a vocational or technical level in performing their jobs.

Of the total workers in agriculturally-oriented jobs, it was estimated that 3359 were technical level workers and 8343 were vocational level workers.

C. Number of Agricultural Technicians Currently Employed.

After careful inspection of the interview data, 122 different agricultural job titles were identified in which some degree of technical-education was required. These 122 job titles included 190 agricultural technicians currently employed. The knowledges required to perform their job activities, and the responsibilites associated with their activities clearly indicated effective job performance at the time of employment could be expected only if the workers had obtained a level of technical education beyond high school.

It was found that 40 businesses of the 284 surveyed had positions which required people defined as agricultural technicians. The detailed information obtained for these positions was given by people active in the work and management of the companies contacted and should accurately reflect how the worker uses knowledge and skills in performing his job. All of these companies were small enough so that the owner or manager had first-hand knowledge of the requirements of each position and knew the workers occupying the position. Table 4 shows the position of the person interviewed in the 40 businesses having agricultural technicians.

TABLE 4

PERSONS INTERVIEWED, BY POSITION IN COMPANY,
IN THE 40 BUSINESSES FROM WHICH DETAILED
AGRICULTURAL TECHNICAL JOB INFORMATION WAS OBTAINED

Position in Company	Number	Per Cent
Owner	3	7.5
Owner-Manager	20	50.0
Manager, hired	10	25.0
Manager, sales	0	0.0
Manager, office	1	2.5
Personnel director	0	0.0
Other	6	15.0
TOTAL	40	100.0

As shown in Table 5, it was estimated that 3359 agricultural technicians were currently employed in the 2351 business firms identified in the region of study.

It should be noted that less than 50 per cent of the agricultural technicians were currently employed in Type 1 businesses. This indicates the importance of potential job openings in Type 2 businesses for persons trained in agricultural skills and with agricultural knowledge.

TABLE 5

ESTIMATED NUMBER OF AGRICULTURAL TECHNICIANS CURRENTLY EMPLOYED IN THE THIRTY-EIGHT COUNTY REGION OF STUDY

Population Stratum and Type of Business	Number of Technicians	
	In Sample	In Universe
Strata 1		
Type 1	19	192
Type 2	1	80
	20	272
Strata 2		
Type 1	37	416
Type 2	4	320
	41	736
Strata 3		
Type 1	108	952
Type 2	21	1399
	129	2351
TOTALS	190	3359

D. Functions of the Businesses Studied.

The data show that: (1) purchasing was the predominant function of 40 firms studied that hire agricultural technicians, and (2) that many of the businesses performed more than one function. The servicing and retailing functions were provided by 18 and 15 respectively of the 40 businesses studied.

Additional Agricultural Technicians Needed

The employers were asked how many different persons had been employed in each job defined as an agricultural-technician job over the past five years, in an effort to estimate employee turnover. Table 6 shows there had been a turnover of 12,017 agricultural technicians in the last five years in the region of study.

TABLE 6

ESTIMATES OF THE NUMBER OF AGRICULTURAL TECHNICIANS
EMPLOYED IN THE LAST 5 YEARS
IN THE THIRTY-EIGHT COUNTY REGION OF STUDY

Population Stratum and Type of Business	Number of Technicians In Sample	In Universe	Per Cent
Strata 1			
Type 1	117	1192	9.9
Type 2	6	480	4.0
	123	1672	
Strata 2			
Type 1	100	1120	9.3
Type 2	20	1600	13.3
	120	2720	
Strata 3			
Type 1	230	2031	16.9
Type 2	84	5594	46.6
	314	7625	
TOTALS	557	12,017	100.0

Employers were also asked to estimate the number of additional workers that would be needed in the next three years and within the next five years due to business growth and employee turnover. According to the data in Tables 7 and 8, the number of additional agricultural technicians needed in the next 3 and 5 year period will be 1155 and 1591 respectively. The 5 year estimate includes the 3 year estimate.

Table 6 clearly shows that the number of agricultural technical workers employed in the past 5 years is considerably larger than the number expected to be needed in the next 3 and 5 year period. This larger number probably reflects business growth, employee turnover, promotions, retirement, lack of educational participation, and a certain satisfaction with workers currently employed. It is also likely that the employer responded to the interviewer's question about workers needed in the future primarily in terms of new workers needed for expansion and did not include the anticipated turnover, retirement, and promotions. The investigators believe it is safe to assume that the actual need for agricultural technicians will approach the proportion employed in the last 5 years. This rationale is based upon more than the numerical information collected, and was an impression obtained which was unqualified, but helps explain the quantified data. There was no data obtained on the inter-group cycling of

workers, but this is not assumed to be large since the trend in the Appalachian is for skilled workers to move out of the area to more lucrative positions elsewhere.

As shown in Table 7, estimates also indicate that a relatively small number of the positions are open on a part-time basis, and constitute less than 10 per cent of the agricultural technician positions to be filled in the next 3 and 5 year period.

TABLE 7

ESTIMATES OF THE NUMBER OF ADDITIONAL AGRICULTURAL TECHNICIANS NEEDED IN THE NEXT 3 YEARS IN TYPE 1 AND 2 BUSINESSES IN THE THIRTY-EIGHT COUNTY REGION OF STUDY

Population Stratum and Type of Business	Number of Agricultural Technicians			
	In Sample		In Universe	
	Full time	Part time	Full time	Part time
Strata 1				
Type 1	0	0	0	0
Type 2	0	0	0	0
Strata 2				
Type 1	9	3	104	32
Type 2	2	0	160	0
Strata 3				
Type 1	37	0	326	0
Type 2	7	1	466	67
Totals	55	4	1056	99
			TOTAL	1155

TABLE 8

ESTIMATES OF THE NUMBER OF ADDITIONAL AGRICULTURAL TECHNICIANS NEEDED IN THE NEXT 5 YEARS IN TYPE 1 AND 2 BUSINESSES IN THE THIRTY-EIGHT COUNTY REGION OF STUDY

Population Stratum and Type of Business	Number of Agricultural Technicians			
	In Sample		In Universe	
	Full time	Part time	Full time	Part time
Strata 1				
Type 1	0	0	0	0
Type 2	1	0	80	0
Strata 2				
Type 1	11	3	120	32
Type 2	2	0	160	0
Strata 3				
Type 1	53	0	466	0
Type 2	10	1	666	67
Totals	77	4	1492	99
			TOTAL	1591

Educational Requirements

At the time of the study, agricultural job titles requiring workers with technical education were being filled with persons who did not posses at time of employment the level of education required for effective job performance. Based on the opinion of employers interviewed, it was estimated that the number of persons classified as agricultural technicians for whose job schooling beyond the high school level was required, was 746. This was about 25 per cent of the total estimated workers classified by definition as agricultural technicians. The interviewers reported that employers indicated a high percentage of the agricultural technicians presently employed were trained on-the-job, and that employers based their opinions on the past experience of hiring a vocational level person and training him on-the-job for technical level responsibilities.

The employers' opinions reflected their experience based on the types of educational programs in existance and the characteristics of the labor force at the time of the study. It has been shown in earlier studies that in states where trained technical workers were available, positions were available for them. Employers in the thirty-eight county region of study have historically not had trained persons available to them. If trained

technical workers were available, employers indicated they would rather hire and pay a higher wage to a trained technical-level person rather than train a vocational-level worker for technical-level responsibilities.

It was estimated that 2667 workers will be needed in the next five years in the job titles defined as agriculture technicians, in the region of study. This estimate is based primarily on business growth, and would be about 525 per year. If we examine the number of agricultural technicians needed during the same period based on employee turnover data we find that 2400 agricultural technicians are needed per year. Therefore, more than 500, but not more than 2400 can be estimated as a realistic goal in establishing educational programs.

Work Experience Requirements

Most agricultural technicians and other technical workers needing technical education must prepare for effective job performance by gaining work experience prior to employment, through formal training on the job, or both. According to the data collected, approximately 90.5 per cent of all future agricultural technicians would be required by employers in Type 1 and Type 2 businesses to possess work experience prior to employment, obtain on-the-job training after employment, or both. However, well planned post-high school educational programs should contain work experience which would shorten the on-the-job training period.

Age Limitations

Age limitations other than those established by law or insurance regulations did not appear a major concern of the employers. Employers indicated that a special age requirement was a specific criterion for employment for approximately 115 of the agricultural technicians. The data showed that age requirements were most often related to the problem of obtaining workers who needed a certain degree of maturity and experience. The most frequently mentioned minimum age ranges for initial employment fell between 18-24 and 25-36.

Determination of Principal Axis Factors for Activities and Knowledges

Since the primary emphasis in the study was to be on jobs requiring agricultural knowledge and skills, it was decided by the investigators that the analyses pertaining to competencies needed would be performed with the 306 agriculturally-oriented job positions on which data had been gathered.

A factor analysis with varimax rotation technique was performed using the IBM 7040 Computer, using the data on the 92 activity and knowledge variables for the 306 agriculturally-oriented job positions. Fifteen factors or "clusters" were identified, with variance accounted for of 63.57 per cent. The fifteen factors which emerged were groupings of competencies with high "factor loadings", and can be translated into major course content areas:

#1. Personnel Supervision and Business Management

Appraising work of others
Supervising others
Handling men(boss)
Inducting new personnel
Training others
Policy-making
Decision-making
Planning
Buying
Taxes
Selecting
Planning production or service
Calculating costs
Inventorying

#2. Mechanical Science and Technology

Adjusting
Repairing
Maintaining
Inspecting,testing,trouble shooting
Operating
Calibrating
Assembling
Installing
Remodeling
Testing
Mixing
Inspecting
Using technical and service manuals and parts lists

#3. Animal Science

Feeds
Animal nutrition
Livestock
Dairy
Poultry
Animal diseases
Rural recreation

#4. Sales and Business Skills

Selling
Meeting non-farm people
Handling money
Promoting
Salesmanship
Meeting farm people
Keeping records and accounts
General agricultural and rural life knowledge
Estimating costs

#5. Plant and Soil Science

Soils
Plant diseases
Soil and water management
Horticulture
Agricultural chemicals
Insect and pest control
Crops
Floriculture

#6. Physical Science Technology

Metallurgy
Electronics
Sound and light
Mechanics
Hydraulics

#7. Technical and Business Communications

Making speeches
Writing articles, copy, etc.
Making technical reports
Developing techniques
Reading technical reports

#8. Agricultural Mechanics

Farm mechanization
Farm conveniences
Tractors and other power units
Agricultural economics
Shop work

#9. Building Design and Construction Technology

Making and building
Designing
Constructing
Assembling

#10. Business Operation

Business principles
Office procedures
Accounting
Credit
Insurance

#11. Farm Building Technology

Farm buildings
Electricity

#12. Food processing

Food processing

#13. Architectural Technology

Architecture
Sketching and drawing
Carpentry
Forestry

#14. Physical Science Research

Research procedures
Physics
Conducting research
Chemistry

#15. Mathematics

Advanced mathematics

Determination of Principal Axis Factors for Job Titles

A factor analysis with varimax rotation technique was performed using the IBM 7040 Computer, to cluster the 126 different agriculturally-oriented job titles (306 job positions) based upon the workers' responses concerning activities and knowledges used in their jobs. A representative profile of the degree of competency needed in each worker activity or area of knowledge was first made for each of the 126 agricultural jobs by calculating the mean to the nearest whole number and tenth value. When the varimax rotation technique was performed, ten "factors" emerged as groupings of job titles with high "factor loadings". The variance accounted for was 64.05 per cent using the rotation technique. The job titles within each of the ten factors are shown in Tables 9 through 18.

Determination of Principal Axis Factors for Activities and Knowledges Within Job Title Factors

Following the factor analysis using the varimax rotation technique to cluster the 126 different agriculturally-oriented job titles, the IBM cards containing the knowledge and activity data were sorted into each of the ten identified job cluster groups. A separate factor analysis procedure with the varimax rotation technique was then performed using the IBM 7040 Computer, to cluster the 92 knowledge and activity variables for the observations within a job cluster. From 3 to 15 activity and knowledge factors or "clusters" were identified for each job cluster. The factors or "clusters" which emerged, are groupings of competencies with high "factor loadings", and can be translated into specific content areas.

The fifteen activity and knowledge factors identifed for job-title cluster 1 were:[2]

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[2]The activity and knowledge factors identified for job title clusters 2 through 10 are shown in the final report.

#1. Management and Supervision - 56 titles

Factor 1

Maintaining
Adjusting
Repairing
Operating
Mixing
Installing
Calibrating
Selecting
Inspecting,testing,trouble shooting

Factor 2

Feeds
Livestock
Animal nutrition
Dairy
Poultry
Animal diseases

Factor 3

Business principles
Office procedures
Taxes
Insurance
Credit
Accounting
Salesmanship

Factor 4

Sound and light
Electronics
Metallurgy
Mechanics
Designing
Remodeling
Sketching and drawing
Hydraulics
Heat

Factor 5

Supervising others
Handling men(boss)
Appraising work of others
Training others
Inducting new personnel
Advising,consulting, and diagnosing
Inspecting

Factor 6

Architecture
Carpentry
Farm buildings
Sketching and drawing

Factor 7

Writing articles, copy, etc.
Making speeches
Developing techniques

Factor 8

Policy-making
Planning
Decision-making
Handling money
Promoting
Buying
Planning production or service

Factor 9

Research procedures
Conducting research
Food processing

Factor 10

Salesmanship
Meeting non-farm people
Meeting farm people
Estimating costs
Selling

Factor 11

Advanced mathematics
Physics

Factor 12

Insect and pest control
Plant diseases
Agricultural chemicals
Soils
Crops
Floriculture
Soil and water management
Horticulture

Factor 13	Factor 14	Factor 15
Constructing equipment, tools(hand or power) supplies and instruments	Shop work	Filing
Designing	Farm mechanization	Inventorying
Making and building	Farm conveniences	Rural recreation
Assembling	Tractors and other power units	Planning production or service
Floriculture	Testing	Keeping records and accounts
	Agricultural economics	
	Electricity	

The Conclusions

A. Estimates derived from the sample data obtained in Type 1 and Type 2 business firms in the 38 country region of study indicated that:

1. Forty per cent of all workers employed in non-farm agricultural businesses (Type 1) need some knowledge and skills in agriculture.

2. Sixteen per cent of all workers employed in non-agricultural businesses that may employ agricultural workers (Type 2) need some knowledge and skills in agriculture.

3. It was possible to project the numbers of employment opportunities for the identified agricultural technical and agricultural vocational job titles. The job-titles were subdivided by level; i.e., technical job or vocational job within each job title cluster. The projections for the job-title cluster 1 are shown in Table 9. The projections for job-title cluster 2 through 10 are shown in Tables 10 through 18 respectively.

4. Of every 10 potential job opportunities for workers needing agricultural knowledge and skills, 6 were in the twenty-eight county Kentucky region studied and 4 were in the ten-county Ohio area studied.

   a) Of every 10 potential job openings in Kentucky, 5 were in telephone exchange areas where the largest town had a population of 5,000 or more, 3 were in telephone exchange areas where the largest town had a population of 1,000-5,000, and 2 were in telephone exchange areas where the largest town had a population of less than 1,000.

   b) Of every 10 potential job openings in Ohio, 6 were in telephone exchange areas where the largest town had a population of 5,000 or more, 2 were in telephone exchange areas where the largest town had a population of 1,000-5,000, and 2 were in telephone exchange areas where the largest town had a population of less than 1,000.

5. Two and one-half times more agricultural vocational workers than agricultural technicians will be needed to take entry-level positions in the next five years.

6. Most of the business firms interviewed were multi-functional, and workers in job titles in the smaller firms tended to hold jobs that were multi-functional in nature. Purchasing, service, and retailing were the predominant functions among the businesses studied.

7. The rate of employee turnover was largest in businesses having the most part-time workers.

8. There appeared to be a high potential for job openings for agricultural-technical workers.

   a) 3359 agricultural-technicians were currently employed.

   b) 8 of every 10 businesses in the universe which employ workers needing agricultural knowledge and skills were businesses which appear non-agricultural.

   c) 3 of every 10 workers employed in agriculturally-oriented jobs studied were performing jobs which required technical level proficiency, while 7 of every 10 workers employed in agriculturally-oriented jobs studied were performing jobs requiring vocational level proficiency.

   d) 9 of every 10 agricultural-technical position openings anticipated in the next five years will be full-time jobs.

   e) At least 500 but not more than 2400 new agricultural technicians will be needed annually in the region of study. This range is evident when we note that 12,017 agricultural technicians were employed in the last five years in the region of study. This was approximately three times the number of new agricultural technicians anticipated in the next five years. It can be concluded there has been a high degree of turnover of agricultural-technical workers, probably due to the trend for these workers to move out of the area to better paying jobs. There was a higher degree of employee turnover in agricultural-technical jobs in the Kentucky counties studied than in the Ohio counties. More specifically, there was a higher degree of employee turnover in agricultural-technical jobs in the telephone exchanges in Kentucky where the population of the largest town was under 1,000 than for similiar geographical areas studied in Ohio.

f) Employers expect a 40 per cent increases in the number of employees needing technical competencies in agriculture in the next five years. This is higher than the anticipated expansion of the total labor force.

g) Employers have been willing to hire untrained persons under 20 years of age and train these people in technical skills on-the-job because the employer had been unable to find trained people. Employers indicated they would rather hire and pay a higher wage to trained-technical workers rather than train a worker on-the-job if trained technical workers are available.

B. It was possible to determine the general competency areas needed for entry and advancement by workers in jobs needing agricultural knowledge and skills, and to group these worker activities and knowledges into clusters so that general competency areas could be identified.

C. It was possible to determine "clusters" or "families" of agricultural-technical and agricultural-vocational job-titles based upon the workers' responses concerning activities and knowledges used in their jobs.

D. It was possible to determine more specific competency needs of workers in agricultural technical and vocational job titles <u>within</u> each job cluster or "family" of job titles identified. This reinforcing technique was designed to enable the investigators to better determine the level of competency needed by workers in job titles identified.

E. The job-titles within each job-title cluster could be defined as technical or vocational level jobs, as shown in Tables 9 though 18. Workers with vocational job titles probably perform the activities and use the knowledges identified at the vocational level, while those workers with technical job titles probably perform activities and use the knowledges identified at the technician level.

<u>Limitations</u>

The study did not include businesses defined as non-agricultural with no apparant possibilities for agricultural workers. However, other state studies have shown that employment opportunities do exist in these kinds of firms for persons who need training in plant and animal science, and agricultural mechanics. Therefore, there probably have been left out some of the agricultural job opportunities.

TABLE 9

NUMBER OF PROJECTED JOB OPPORTUNITIES FOR JOB TITLE CLUSTER 1 OF IDENTIFIED AGRICULTURAL VOCATIONAL AND TECHNICAL JOB TITLES, IN THE THIRTY-EIGHT COUNTY REGION OF STUDY

Agricultural Technical Job Title	Number Currently Employed		Projected Job Opportunities			
			3 Years		5 Years	
	Part Time	Full Time	Part Time	Full Time	Part Time	Full Time
General director of small farm building, farm equipment, and lumber company.	0	6	0	6	0	6
General director of garage and service station.	0	6	0	6	0	6
General director for heating and plumbing company.	0	1	0	0	40	0
General director of show and riding academy, horse farm and hospital.	1	1	0	5	0	5
General director of retail florist shop.	0	11	0	8	0	8
General director for egg buying, grading and wholesale-retail company.	0	5	0	0	0	0
General director of large farm building construction, farm equipment sales, and lumber company.	0	10	0	0	0	0
Sales manager for insurance company.	0	3	0	0	0	0
General manager of public utilities and fuel distribution company.	0	1	0	80	0	80
General director of landscaping, florist, and greenhouse business.	1	14	0	0	0	0
Naturalist in State Park.	1	0	66	0	66	0
Director of retail meat and grocery store.	0	2	0	0	0	0
General director for insurance company.	0	12	0	160	0	160

TABLE 9-continued

Agricultural Technical Job Title	Number Currently Employed		Projected Job Opportunities 3 Years		5 Years	
	Part Time	Full Time	Part Time	Full Time	Part Time	Full Time
Office manager for farm machinery sales and service company.	0	1	0	0	0	0
Products salesman and office manager for stone company.	0	2	0	0	0	0
Service supervisor for farm machinery company.	0	1	0	0	0	0
General director of slaughter and meat processing company.	1	3	0	0	0	0
Service director of pest control company.	2	5	0	6	0	6
General director of state police district station.	0	2	0	0	0	66
Sales manager for hardware, electrical, plumbing, and building-supply store.	2	11	0	0	0	0
Truck driver for dairy products, meat and grocery company.	0	4	0	10	0	10
Totals for Agricultural Technical Job Titles	8	101	66	281	106	347

Agricultural Vocational Job Title	Number Currently Employed		Projected Job Opportunities 3 Years		5 Years	
	Part Time	Full Time	Part Time	Full Time	Part Time	Full Time
General director of rural grocery and variety store.	0	32	0	0	0	0
General director and distributor for wholesale and retail dairy products, meats and grocery company.	0	8	0	0	0	6

TABLE 9-continued

Agricultural Vocational Job Title	Number Currently Employed		Projected Job Opportunities			
			3 Years		5 Years	
	Part Time	Full Time	Part Time	Full Time	Part Time	Full Time
Agent for insurance company.	0	3	0	40	0	40
General director of hardware store and feed mill.	1	1	0	0	0	0
General director of motor company.	0	6	0	0	0	0
General director of hardware, electrical and building supply, paint, and wallpaper company.	0	8	0	0	0	0
General director of farm machinery and equipment sales and service company, including auto and truck sales and service.	1	14	0	6	0	6
General director of pest control company.	0	6	0	0	0	0
General director and district distributor in petroleum bulk plant.	0	5	0	0	0	0
General director of feed mill, farm supply store, and farm machinery sales and service.	1	26	0	11	0	11
Bookkeeper in livestock sales company.	0	1	0	0	0	0
Office director or branch manager for wholesale and retail dairy products, meat, and grocery company.	0	1	0	0	0	0
General director of ice cream and dairy products company.	0	3	0	0	0	0
General director and manager of tobacco warehouse company.	0	14	0	47	0	77
General director of grocery store.	0	13	0	0	0	0

TABLE 9-continued

Agricultural Vocational Job Title	Number Currently Employed		Projected Job Opportunities			
			3 Years		5 Years	
	Part Time	Full Time	Part Time	Full Time	Part Time	Full Time
General director of vegetable producing company.	0	4	0	0	0	0
Director of general farm supply and service company.	0	4	0	0	0	0
General director of grain elevator and farm supply store.	0	1	0	0	0	0
General director of restaurant and liquors store.	0	13	0	0	0	0
General manager of real estate company.	0	2	0	0	0	0
Director of aluminum siding company.	0	1	0	0	0	0
General director of wholesale vegetable produce and sales company.	1	4	0	0	0	0
General director of livestock auction company.	0	2	0	0	0	0
Shop foreman for farm building construction, farm equipment, lumber, and coal company.	0	2	0	0	0	0
General director of ready mix concrete and concrete block company.	0	3	0	0	0	0
Salesman in pest control company.	0	14	0	6	0	6
General director for livestock marketing cooperative.	0	1	0	0	0	0
Office director of livestock marketing cooperative.	0	1	0	0	0	0
Life insurance agent.	0	23	0	132	0	66

TABLE 9-continued

Agricultural Vocational Job Title	Number Currently Employed		Projected Job Opportunities			
			3 Years		5 Years	
	Part Time	Full Time	Part Time	Full Time	Part Time	Full Time
General director and mill operator for feed and farm supply store.	0	3	0	0	0	0
Clerk for grocery and variety store.	21	15	0	1120	0	1920
General director of service station, tractor and truck repair shop.	0	5	0	0	0	0
Totals for Agricultural Vocational Job Titles	25	239	0	1362	0	2132
TOTALS FOR AGRICULTURAL TECHNICAL AND VOCATIONAL JOB TITLES	33	366	66	1643	106	2479

TABLE 10

NUMBER OF PROJECTED JOB OPPORTUNITIES FOR JOB TITLE CLUSTER 2 OF IDENTIFIED AGRICULTURAL VOCATIONAL AND TECHNICAL JOB TITLES, IN THE THIRTY-EIGHT COUNTY REGION OF STUDY

Agricultural Technical Job Title	Number Currently Employed		Projected Job Opportunities			
			3 Years		5 Years	
	Part Time	Full Time	Part Time	Full Time	Part Time	Full Time
Mechanic for automobile, tractor, and power unit repair company.	0	2	0	0	0	0
Serviceman for furnace company.	0	2	0	0	0	0
Mechanic for feed mill and farm and dairy supply store.	0	5	0	5	0	5
Mechanic for farm machinery, farm equipment, automobile, and truck company.	1	17	0	43	0	80
Head mechanic and salesman for farm machinery and equipment company.	2	4	0	0	0	0
Plumber for plumbing company.	0	1	0	80	0	80
Service station attendant and automobile mechanic.	1	16	0	20	0	73
Weighman and general worker in tobacco warehouse company.	8	11	21	82	21	123
Maintenance man for feed mill and grain elevator.	0	1	0	0	0	0
Shop foreman for farm machinery sales and service company.	0	1	0	0	0	0
Clerk in feed mill.	0	1	0	0	0	0
Route serviceman for pest control company.	2	25	0	26	0	26
Freezer inspection man for dairy products company.	0	2	0	0	0	0

TABLE 10-continued

Agricultural Technical Job Title	Number Currently Employed		Projected Job Opportunities			
			3 Years		5 Years	
	Part Time	Full Time	Part Time	Full Time	Part Time	Full Time
Electrician for plumbing company.	0	1	0	80	0	80
Claims adjuster for insurance company.	0	11	0	132	0	66
Plant foreman for stone and concrete block company.	0	14	0	0	0	7
General director of florist and greenhouse business.	1	1	0	0	0	0
Totals for Agricultural Technical Job Titles	15	115	21	468	21	540
Agricultural Vocational Job Title	**Number Currently Employed**		**Projected Job Opportunities**			
			3 Years		5 Years	
	Part Time	Full Time	Part Time	Full Time	Part Time	Full Time
General director for nursing home.	0	3	0	0	0	0
Truck driver and yard worker for small farm building, farm equipment, lumber and coal company.	0	25	0	800	0	1056
Bottling machine operator for dairy products company.	0	1	0	0	0	0
Weighman in livestock sales company.	4	0	43	0	74	0
Salesman in feed and farm supply store.	2	7	0	12	0	12
Totals for Agricultural Vocational Job Titles	6	36	43	812	74	1068
TOTALS FOR AGRICULTURAL TECHNICAL AND VOCATIONAL JOB TITLES	21	161	64	1280	95	1608

TABLE 11

NUMBER OF PROJECTED JOB OPPORTUNITIES FOR JOB TITLE CLUSTER 3 OF IDENTIFIED AGRICULTURAL VOCATIONAL AND TECHNICAL JOB TITLES, IN THE THIRTY-EIGHT COUNTY REGION OF STUDY

Agricultural Technical Job Title	Number Currently Employed		Projected Job Opportunities			
			3 Years		5 Years	
	Part Time	Full Time	Part Time	Full Time	Part Time	Full Time
Grader for a livestock cooperative.	2	2	0	0	0	0
Yardman for stockyard and feeder cattle business.	0	1	0	24	0	54
Millman for feed mill.	0	11	0	21	0	27
Meat cutter for supermarket.	0	5	0	60	0	120
Seed cleaning and inspection foreman for seed company.	0	1	0	0	0	0
Totals for Agricultural Technical Job Title	2	20	0	105	0	201

Agricultural Vocational Job Title	Number Currently Employed		Projected Job Opportunities			
			3 Years		5 Years	
	Part Time	Full Time	Part Time	Full Time	Part Time	Full Time
Conservation instructor in 4-H camp.	3	0	8	0	16	0
Butcher for frozen food locker and meat processing company, including sausage making and boning.	0	14	0	160	0	160
Warehouse man for feed mill, farm supply fertilizer, and lumber company.	0	2	0	14	0	14
Salesman for feed mill and farm supply store.	2	7	0	12	0	12
Totals for Agricultural Vocational Job Titles	5	23	8	186	16	186
TOTALS FOR AGRICULTURAL TECHNICAL AND VOCATIONAL JOB TITLES	7	43	8	291	16	387

TABLE 12

NUMBER OF PROJECTED JOB OPPORTUNITIES FOR JOB TITLE CLUSTER 4 OF IDENTIFIED AGRICULTURAL VOCATIONAL AND TECHNICAL JOB TITLES, IN THE THIRTY-EIGHT COUNTY REGION OF STUDY

Agricultural Technical Job Title	Number Currently Employed		Projected Job Opportunities			
			3 Years		5 Years	
	Part Time	Full Time	Part Time	Full Time	Part Time	Full Time
Director of farm management company.	0	1	0	7	0	7
Hatchery operator and breed selection man for poultry company.	0	1	0	0	0	0
Totals for Agricultural Technical Job Titles	0	2	0	7	0	7
Agricultural Vocational Job Title	**Number Currently Employed**		**Projected Job Opportunities**			
			3 Years		5 Years	
	Part Time	Full Time	Part Time	Full Time	Part Time	Full Time
Exercise boy and groom boy for horse rehabilitation farm and horse hospital.	0	12	0	2800	0	4000
Foreman for horse rehabilitation farm and horse hospital.	0	1	0	0	0	0
Contact man for livestock auction company.	0	2	0	0	0	0
Produce man in supermarket-grocery store.	0	4	0	160	0	320
Field service worker for health department.	0	8	0	0	0	0
General worker in farm supply and service company.	3	0	56	0	93	0
Totals for Agricultural Vocational Job Titles	3	27	56	2960	93	4320
TOTALS FOR AGRICULTURAL TECHNICAL AND VOCATIONAL JOB TITLES	3	29	56	2967	93	4327

TABLE 13

NUMBER OF PROJECTED JOB OPPORTUNITIES FOR JOB TITLE CLUSTER 5 OF IDENTIFIED AGRICULTURAL VOCATIONAL AND TECHNICAL JOB TITLES, IN THE THIRTY-EIGHT COUNTY REGION OF STUDY

Agricultural Technical Job Title	Number Currently Employed		Projected Job Opportunities			
			3 Years		5 Years	
	Part Time	Full Time	Part Time	Full Time	Part Time	Full Time
Custodian for public school system, state park, church, hotel, nursing home, and department store.	8	26	0	198	0	0
Totals for Agricultural Technical Job Title	8	26	0	198	0	0

Agricultural Vocational Job Title	Number Currently Employed		Projected Job Opportunities			
			3 Years		5 Years	
	Part Time	Full Time	Part Time	Full Time	Part Time	Full Time
Worker for vegetable producing company.	23	0	50	0	75	0
Worker in wholesale vegetable producing company.	5	0	12	0	24	0
Deliveryman for retail florist shop.	0	1	0	0	0	0
Truck driver for livestock marketing and auction company.	2	0	0	0	0	0
Cook for camp,school,restaurant,or nursing home.	6	35	60	66	132	0
Plant process man for poultry processing company.	0	25	0	149	0	198
General director and mill operator for feed and farm supply store.	0	3	0	0	0	0

TABLE 13-continued

Agricultural Vocational Job Title	Number Currently Employed		Projected Job Opportunities			
			3 Years		5 Years	
	Part Time	Full Time	Part Time	Full Time	Part Time	Full Time
Truck driver and helper for feed mill, grain elevator, farm implement, fertilizer, and livestock supply store.	2	10	10	26	15	30
Route salesman for wholesale and retail dairy products, meat, and grocery store.	0	15	0	20	0	25
Sales clerk and bookkeeper in retail meat store and meat processing company.	4	22	0	10	0	10
Total- for Agricultural Vocational Job Titles	42	111	132	271	246	263
TOTALS FOR AGRICULTURAL VOCATIONAL AND TECHNICAL JOB TITLES	50	137	132	409	246	263

TABLE 14

NUMBER OF PROJECTED JOB OPPORTUNITIES FOR JOB TITLE CLUSTER 6 OF IDENTIFIED AGRICULTURAL VOCATIONAL AND TECHNICAL JOB TITLES, IN THE THIRTY-EIGHT COUNTY REGION OF STUDY

Agricultural Technical Job Title	Number Currently Employed		Projected Job Opportunities			
			3 Years		5 Years	
	Part Time	Full Time	Part Time	Full Time	Part Time	Full Time
Salesman for farm machinery, automobile and truck equipment sales and service, and feed company.	1	15	0	20	0	25
Totals for Agricultural Technical Job Title	1	15	0	20	0	25
Totals for Agricultural Vocational Job Title	0	0	0	0	0	0
TOTALS FOR AGRICULTURAL TECHNICAL AND VOCATIONAL JOB TITLES	1	15	0	20	0	25

TABLE 15

NUMBER OF PROJECTED JOB OPPORTUNITIES FOR JOB TITLE CLUSTER 7 OF IDENTIFIED AGRICULTURAL VOCATIONAL AND TECHNICAL JOB TITLES, IN THE THIRTY-EIGHT COUNTY REGION OF STUDY

Agricultural Technical Job Title	Number Currently Employed		Projected Job Opportunities			
			3 Years		5 Years	
	Part Time	Full Time	Part Time	Full Time	Part Time	Full Time
Salesman for egg, poultry, and poultry processing company.	0	1	0	15	0	25
Totals for Agricultural Technical Job Title	0	1	0	15	0	25
Agricultural Vocational Job Title	**Number Currently Employed**		**Projected Job Opportunities**			
			3 Years		5 Years	
	Part Time	Full Time	Part Time	Full Time	Part Time	Full Time
Office worker in tobacco warehouse company.	0	7	0	0	0	0
Truck driver pick-up man for wholesale-retail egg company.	1	2	16	0	16	0
Totals for Agricultural Vocational Job Titles	1	9	16	0	16	0
TOTALS FOR AGRICULTURAL TECHNICAL AND VOCATIONAL JOB TITLES	1	10	16	15	16	25

TABLE 16

NUMBER OF PROJECTED JOB OPPORTUNITIES FOR JOB TITLE CLUSTER 8 OF IDENTIFIED AGRICULTURAL VOCATIONAL AND TECHNICAL JOB TITLES, IN THE THIRTY-EIGHT COUNTY REGION OF STUDY

Agricultural Technical Job Title	Number Currently Employed		Projected Job Opportunities			
			3 Years		5 Years	
	Part Time	Full Time	Part Time	Full Time	Part Time	Full Time
Worker for landscaping and greenhouse business.	1	7	0	24	0	40
Outside foreman for grain elevator, feed mill, farm supply, and farm machinery sales company.	0	2	0	0	0	0
Totals for Agricultural Technical Job Titles	1	9	0	24	0	40
Agricultural Vocational Job Title	Number Currently Employed		Projected Job Opportunities			
			3 Years		5 Years	
	Part Time	Full Time	Part Time	Full Time	Part Time	Full Time
Clerk in feed mill and farm supply store.	0	4	0	8	0	8
General director for fertilizer and limestone company.	0	1	0	0	0	0
Totals for Agricultural Vocational Job Titles	0	5	0	8	0	8
TOTALS FOR AGRICULTURAL TECHNICAL AND VOCATIONAL JOB TITLES	1	14	0	32	0	48

TABLE 17

NUMBER OF PROJECTED JOB OPPORTUNITIES FOR JOB TITLE CLUSTER 9 OF IDENTIFIED AGRICULTURAL VOCATIONAL AND TECHNICAL JOB TITLES, IN THE THIRTY-EIGHT COUNTY REGION OF STUDY

Agricultural Technical Job Title	Number Currently Employed		Projected Job Opportunities			
			3 Years		5 Years	
	Part Time	Full Time	Part Time	Full Time	Part Time	Full Time
Caretaker in show and riding academy, including horse trainer on horse farm.	0	1	0	5	0	5
Totals for Agricultural Technical Job Titles	0	1	0	5	0	5

Agricultural Vocational Job Title	Number Currently Employed		Projected Job Opportunities			
			3 Years		5 Years	
	Part Time	Full Time	Part Time	Full Time	Part Time	Full Time
Maintenance man in state park.	0	2	0	0	0	0
Totals for Agricultural Vocational Job Title	0	2	0	0	0	0
TOTALS FOR AGRICULTURAL TECHNICAL AND VOCATIONAL JOB TITLES	0	3	0	5	0	5

TABLE 18

NUMBER OF PROJECTED JOB OPPORTUNITIES FOR JOB TITLE CLUSTER 10 OF IDENTIFIED AGRICULTURAL VOCATIONAL AND TECHNICAL JOB TITLES, IN THE THIRTY-EIGHT COUNTY REGION OF STUDY

Agricultural Technical Job Title	Number Currently Employed		Projected Job Opportunities			
			3 Years		5 Years	
	Part Time	Full Time	Part Time	Full Time	Part Time	Full Time
Sales manager for hardware, electrical, plumbing, and building supply store.	0	4	0	0	0	0
Carpenter for lumber and farm building construction company.	1	32	15	99	15	191
Totals for Agricultural Technical Job Titles	1	36	15	99	15	191

Agricultural Vocational Job Title	Number Currently Employed		Projected Job Opportunities			
			3 Years		5 Years	
	Part Time	Full Time	Part Time	Full Time	Part Time	Full Time
Shipping manager for hardware, building, plumbing, and electrical supply company.	0	1	0	0	0	0
Totals for Agricultural Vocational Job Titles	0	1	0	0	0	0
TOTALS FOR AGRICULTURAL TECHNICAL AND VOCATIONAL JOB TITLES	1	37	15	99	15	191

The Recommendations

Information has been presented concerning:

1. Identification of agriculturally-oriented jobs.

2. Employment opportunities in the jobs identified.

3. How the activities used and knowledges needed by workers cluster together in general courses which may be offered.

4. How the identified job titles cluster together for training.

Who May Use the Results

The information presented in this report should be of interest to employment service counselors, personnel directors, employee counselors, school counselors, vocational and technical teachers, educational leaders, and laymen who are involved in the research, planning and carrying-out of training programs at all experience and educational levels.

In a special effort to make the results more meaningful to user groups, the research staff carefully compared each of the agriculturally-oriented job titles identified with job descriptions in the Dictionary of Occupational Titles, Third Edition, 1965. The names and D.O.T. numbers were listed for the Dictionary of Occupational Title(s) most nearly corresponding to the job description as obtained by the interviewers, and are presented in Appendix C. Many of the D.O.T. job-titles fall in the plant and animal science, or mechanics areas, and tend to be based upon worker functions.

How the Results May be Used

1. The investigators believe the data have been scientifically obtained and systematically analyzed to this stage of curriculum development. The activity and knowledge factors identified tell the investigators what general areas of knowledge the workers need as they perform identified job activities. The identified job title clusters tell the investigators what kind of people can be trained together, based upon their responses on the activities and knowledges.

2. It is not practical to have a different curriculum for each different job title identified for which workers should be trained. For example, there are 56 job titles in job-title cluster 1. According to the data in Table 9, these 56 job titles represent 2479 full-time job opportunities in the next five years; 347 jobs at the technical level and 2132 jobs at the vocational level. Persons with these job titles may be pursuing varing curriculums, but can be trained together in the following general courses:

#1. Management and Supervision - 56 titles

Factor 1	Factor 2	Factor 3
Maintaining	Feeds	Business principles
Adjusting	Livestock	Office procedures
Repairing	Animal nutrition	Taxes
Operating	Dairy	Insurance
Mixing	Poultry	Credit
Installing	Animal diseases	Accounting
Calibrating		Salesmanship
Selecting		
Inspecting, testing, trouble shooting		

Factor 4	Factor 5	Factor 6
Sound and light	Supervising others	Architecture
Electronics	Handling men (boss)	Carpentry
Metallurgy	Appraising work of others	Farm buildings
Mechanics	Training others	Sketching and drawing
Designing	Inducting new personnel	
Remodeling	Advising, consulting, and diagnosing	
Sketching and drawing	Inspecting	
Hydraulics		
Heat		

Factor 7	Factor 8	Factor 9
Writing articles, copy, etc.	Policy-making	Research procedures
Making speeches	Planning	Conducting research
Developing techniques	Decision-making	Food processing
	Handling money	
	Promoting	
	Buying	
	Planning production or service	

Factor 10	Factor 11	Factor 12
Salesmanship	Advanced mathematics	Insect and pest control
Meeting non-farm people	Physics	Plant diseases
Meeting farm people		Agricultural chemicals
Estimating costs		Soils
Selling		Crops
		Floriculture
		Soil and water management
		Horticulture

#1. Management and Supervision - 56 titles, continued

Factor 13	Factor 14	Factor 15
Constructing equipment, tools(hand or power) supplies and instruments	Shop work	Filing
Designing	Farm mechanization	Inventorying
Making and building	Farm conveniences	Rural recreation
Assembling	Tractors and other power units	Planning production or service
Floriculture	Testing	Keeping records and accounts
	Agricultural economics	
	Electricity	

3. The study does not provide data which indicate the details needed within the general areas of knowledge. The narrative description obtained by the interviewers on each position interviewed should aid the curriculum planner in understanding how the knowledges are used in the jobs identified, but the curriculum planner must refine the curriculum and therefore will need to obtain more detailed information concerning the identified areas of knowledge and worker activities before units of instruction can be planned.

4. The level of need for activities and knowledges by workers in the job-titles identified should have basic implications for the methodology of training programs. The instructional programs planned for the agricultural vocational jobs in the cluster should be more basic and general in nature than for courses which would train for agricultural-technical jobs in the same cluster. Persons preparing for all those agricultural technical jobs having a high factor loading should have courses which contain those activities and knowledges taught in a way they would be used on the job.

5. The in-school instructional programs at the vocational and technical levels should provide the broad theoretical base for the learning of applied principles and details in an on-the-job experience program as a part of the course of study. These on-the-job experience programs should be conducted at:

   a) The high school level.

   b) The university associate-degree level.

   c) The multi-level area vocational and technical school level.

6. Advisory groups made up of educators and business representatives should evaluate these research findings, and advise the curriculum planner concerning the experience programs.

7. New vocational and technical programs should be designed to train persons to enter and advance in positions they now hold in Appalachia. Vocational agriculture programs at the high school level will need to be redesigned in order to adequately train people to take entry positions in vocational jobs identified. These specialized courses in agriculture at the high school and post-high school level may be supported by other technical subjects taught in the comprehensive high school and post-high school institutions.

8. Since there is a high mobility of workers, and since the entry job may not be in the same geographical area where the second or third job may be located, there is justification for training for a "family" or cluster of jobs as is being recommended in the curriculum planning approach in this study.

9. This curriculum planning approach should have implications for guidance purposes, in that curriculums will provide basic education for all the job-titles included in a particular cluster or "family" of jobs.

10. New educational and guidance programs must re-orient the prospective employee to the idea that he need not seek employment in a readily identifiable agricultural business to find a job. As the study shows, persons with agricultural knowledge and skills are rather widely marketable in businesses that appear non-agricultural but employ people needing these knowledges and skills.

11. Financial support should be sought for well-planned pilot programs at the university associate-degree level, multi-level area vocational and technical school level, and high school vocational level in order to further refine and evaluate more detailed curriculums.

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_____ Interviewer Identification Code __ _____ _____ _____ _____ _____
1-D 2-4TE 5-PS 6-TB 7-AC 8-10F

Date _____

EMPLOYMENT OPPORTUNITIES AND AGRICULTURAL COMPETENCIES STUDY
STAFF STUDY IN AGRICULTURAL TECHNOLOGY
Morehead State University

FORM 1

I Name of Company or Firm _____

_____

II Address of Firm _____

Name of Person Contacted _____ Tele. _____

_____III-IV Position in Company of Person Interviewed 1. Owner

2. Owner-Manager 3. Manager-hired 4. Personnel director

5. Sales Manager 6. Office Manager 7. Other (specify)

_____

V Functions of Company

_____12 Manufacturing
_____13 Purchasing
_____14 Service
_____15 Constructing
_____16 Retailing
_____17 Warehouse
_____18 Processing
_____19 Wholesaling
_____20 Contractor
_____21 Other(specify)_____

VI Products, Services or Functions of Company

_____

_____

_____

_____

_____

VII Type of Business

_ _ _22-24 Percentage of business agricultural oriented

_ _ _25-27 Percentage of business non-agricultural

VIII

_ _ _28-30 Total number of workers (owners and employees)

FORM 1

1-D 2-4TE 5-PS 6-TB 7-AC 8-10F

IX Present and Anticipated job titles, and number of workers in each.

31-34 JT	35-37 BJT Code	Job Title	Number Normally Employed Last Calendar Year: Full Time 38-40	Number Normally Employed Last Calendar Year: Part Time 41-43	Number of New Workers Likely To Be Employed In: Next 3 Year Period: Full Time 44-46	Next 3 Year Period: Part Time 47-49	Next 5 Year Period (1970): Full Time 50-52	Next 5 Year Period (1970): Part Time 53-55
———	---	———	---	---	---	---	---	---

Identification Code

___ ____ ___ ___ ___ ____ _____ _____

1-D 2-4TE 5-PS 6-TB 7-AC 8-10F 11-14JT 15-17BJT

____ Interviewer

EMPLOYMENT OPPORTUNITIES AND AGRICULTURAL COMPETENCIES STUDY
STAFF STUDY IN AGRICULTURAL TECHNOLOGY
Morehead State College

FORM 2

I Name and Address of Firm _____

_____

II Job Title _____

III Alternative Titles _____

IV Source and Location of Job in Company Dept., Div., etc. _____

_____

___18-19 V _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _

___20-21 VI Number of Workers with title

VII Activities and Duties of Persons with This Job Title

VIIA Working with People Outside Firm

____22 Meeting farm people
____23 Meeting non-farm people
____24 Selling
____25 Advising, consulting and diagnosing
____26 Estimating costs
____27 Buying
____28 Other (specify) _____

Clarification Comments

_____
_____
_____
_____
_____

VIIB Working with Personnel in Firm

____29 Handling men (boss)
____30 Inducting new personnel
____31 Training others
____32 Appraising work of others
____33 Supervising others
____34 Other (specify) _____

VIIC Working with Production, Products, Materials or Service

____35 Designing
____36 Making and building
____37 Sketching and drawing
____38 Mixing
____39 Assembling
____40 Inspecting
____41 Testing
____42 Calculating costs
____43 Conducting research
____44 Using technical and service manuals, parts lists
____45 Developing techniques
____46 Planning production or service
____47 Other (specify)_____

Clarification Comments

_____
_____
_____
_____
_____
_____
_____
_____

FORM 2

5-PS 6-7B 7-AC 8-10F 11-14JT 15-17BJT

VIID Working with Firm's or Customers; Equipment, Tools (hand or power) Supplies and Instruments

____48 Constructing above
____49 Designing
____50 Repairing
____51 Operating
____52 Assembling
____53 Calibrating
____54 Remodeling
____55 Adjusting
____56 Maintaining
____57 Inspecting, Testing, Trouble Shooting
____58 Installing
____59 Selecting
____60 Other (specify)_____
Clarification Comments

_____
_____
_____
_____
_____

VIIE Working with Business Problems

____61 Policy-making
____62 Planning
____63 Promoting
____64 Handling money
____65 Keeping records and accounts
____66 Writing articles, copy, etc.
____67 Making speeches
____68 Filing
____69 Inventorying
____70 Making tech. reports
____71 Reading Tech. reports
____72 Decision making
____73 Other (specify) _____
Clarification Comments

_____
_____
_____
_____
_____
_____

DECK 3:

VIII Areas with Which Worker MUST Be Familiar to Do Job

____18 Soils
____19 Soil and water management
____20 Crops
____21 Horticulture
____22 Floriculture
____23 Livestock
____24 Poultry
____25 Dairy
____26 Feeds
____27 Animal nutrition
____28 Animal diseases
____29 Plant diseases
____30 Tractors and other power units
____31 Electricity
____32 Farm mechanization
____33 Shop work
____34 Carpentry
____35 Farm Buildings
____36 Farm conveniences
____37 Agricultural Economics
____38 General Agriculture and rural life knowledge
____39 Agricultural chemicals
____40 Insect and pest control
____41 Forestry
____42 Food processing
____43 Rural recreation
____44 Credit
____45 Insurance
____46 Taxes
____47 Accounting
____48 Business principles
____49 Office procedures
____50 Salesmanship

_____

____51 Chemistry
____52 Physics
____53 Advanced Mathematics
____54 Foreign Language
____55 Research procedures
____56 Electronics
____57 Mechanics
____58 Sound and light
____59 Hydraulics
____60 Metallurgy
____61 Heat
____62 Architecture
____63 Other (specify) _____

FORM 2

5-PS 6-TB 7-AC 8-10F 11-14JT 15-17BJT

Clarification Comments

DECK 4:

IX Prerequisites of Job

____18 Work experience required
____19 Prior to acceptance of job
____20 On-Job-Training

Clarification Comments

____21 Are there specific policy limitations on ages for employment? If so, what:

____22 Education - minimum formal schooling required

1. Less than 4 years
2. Less than 8 years
3. Less than 12 years
4. High school graduate
5. Less than 16 years
6. College graduate or more

X Employment Opportunities

___23-25 Total number of different persons with this job title employed in the past five years.

___26-27 Anticipated additional persons with job-title needed in the next 3 years (1968) period due to growth and turnover.

___28-29 Anticipated additional persons with job-title needed in five years (1970) due to growth and turnover. (Includes those in 26-27 above).

___30-32 Percentage of employees with this job-title obtained nearby (within 25 miles).

___33-35 Percentages of employees with this job-title obtained from a distance (beyond 25 miles).

Clarification Comments

FORM 3

_____ Interviewer

Code ___ _____ ___ ___ _____ _____ _____
1-D 2-4TE 5-PS 7-AC 8-10F 11-14JT 15-17BJT

XI SUMMARY DESCRIPTION OF JOB

Job Title _____

Description of activities and duties:

Description of level of job, interesting characteristics, and miscellaneous comments:

_____36 Is this a technician level job: Explain why, if not explained above.

_____37 Is this an agricultural oriented job: Explain why, if not explained above.

THE 92 ACTIVITY AND KNOWLEDGE VARIABLES ON WHICH DATA WERE GATHERED

Staff Study in Agricultural Technology

Morehead State University
Morehead, Kentucky

Working with People Outside Firm

1 Meeting farm people
2 Meeting non-farm people
3 Selling
4 Advising, consulting and diagnosing
5 Estimating costs
6 Buying

Working with Personnel In Firm

7 Handling men(boss)
8 Inducting new personnel
9 Training others
10 Appraising work of others
11 Supervising others

Working with Production, Products, Materials or Service

12 Designing
13 Making and building
14 Sketching and drawing
15 Mixing
16 Assembling
17 Inspecting
18 Testing
19 Calculating costs
20 Conducting research
21 Using technical and service manuals, parts lists
22 Developing techniques
23 Planning production or service.

Working with Firm's or Customers; Equipment, Tools (hand or power) Supplies and Instruments

24 Constructing above
25 Designing
26 Repairing
27 Operating
28 Assembling
29 Calibrating
30 Remodeling
31 Adjusting
32 Maintaining
33 Inspecting, Testing, Trouble Shooting
34 Installing
35 Selecting

Working with Business Problems

36 Policy-making
37 Planning
38 Promoting
39 Handling money
40 Keeping records and accounts
41 Writing articles, copy, etc.
42 Making speeches
43 Filing
44 Inventorying
45 Making technical reports
46 Reading technical reports
47 Decision-making

THE 92 ACTIVITY AND KNOWLEDGE VARIABLES
ON WHICH DATA WERE GATHERED, continued

Staff Study in Agriculture Technology

Morehead State University
Morehead, Kentucky

Areas with Which Worker MUST Be Familiar to do Job

48 Soils
49 Soil and water management
50 Crops
51 Horticulture
52 Floriculture
53 Livestock
54 Poultry
55 Dairy
56 Feeds
57 Animal nutrition
58 Animal diseases
59 Plant diseases
60 Tractors and other power units
61 Electricity
62 Farm mechanization
63 Shop work
64 Carpentry
65 Farm buildings
66 Farm conveniences
67 Agricultural economics
68 General agriculture and rural life knowledge
69 Agricultural chemicals
70 Insect and pest control
71 Forestry
72 Food processing
73 Rural recreation
74 Credit
75 Insurance
76 Taxes
77 Accounting
78 Business principles
79 Office procedures
80 Salesmanship
81 Chemistry
82 Physics
83 Advanced mathematics
84 Foreign language
85 Research procedures
86 Electronics
87 Mechanics
88 Sound and light
89 Hydraulics
90 Metallurgy
91 Heat
92 Architecture

DICTIONARY OF OCCUPATIONAL TITLES FOR 126 AGRICULTURALLY-ORIENTED JOB TITLES IDENTIFIED IN THE MOREHEAD STATE UNIVERSITY STUDY

Staff Study in Agricultural Technology
Morehead State University
Morehead, Kentucky

BJT Code ***	Occupational Titles Defined In Morehead State University Study	Dictionary of Occupational Titles, Third Edition, 1965
001	General Director of large farm building construction, farm equipment, sales, and lumber company.	Store Manager(ret.trade) (185.168)
004	General Director of small farm building, farm equipment, and lumber company.	Store Manager(ret.trade) (185.168)
012	General Director of farm machinery and equipment sales, and service company, including autombile and truck sales and service.	Store Manager(ret.trade) (185.168)
014	Director of Aluminum siding company.	Store Manager(ret.trade) (185.168)
021	Truck driver and yard worker for small farm building, farm equipment, lumber and coal company.	Truck driver, Heavy (any ind)(905.883)
027	Carpenter for lumber and farm building construction company.	Carpenter, construction (860.381)
033	Head mechanic and salesman for farm machinery and equipment company.	Salesman, tractor and farm implements(ret.trade whlse.trade)(277.358) Farm equipment mechanic (agric.)(624.281)
034	Mechanic for farm machinery automobile and truck company.	Farm equipment mechanic (agric.)(624.281)
035	Mechanic for automobile,tractor, and power unit repair company.	Auto-Tractor mechanic (620.281)
043	Salesman for farm silo construction, lumber, and farm building company.	Salesman, farm and garden supplies(whlse. trade) (277.358)

BJT Code	Occupational Titles Defined In Morehead State University Study	Dictionary of Occupational Titles, Third Edition, 1965
044	Salesman for farm machinery, automobile and truck, equipment sales and service, and feed company.	Salesman, tractor and farm implements(ret.&whlse.tr.) (277.358) Salesman, grain and feed products (whlse. trade) (262.358)
045	Parts salesman for farm machinery, automobile and truck sales company.	Sales clerk (ret. trade) (290.478) Salesman, tractor and farm implements(ret.&whlse.tr.) (277.358)
052	Clerk and bookkeeper for small farm building, farm equipment, and lumber company.	Bookkeeper (clerical) (210.388)
058	Shop foreman for farm building construction, farm equipment, lumber and coal company.	Production foreman (any ind) (699.138) Service Manager(187.168)
060	Service supervisor for farm machinery company.	Manager, Service Dept. (whlse.trade)(187.168)
062	Shop foreman for farm machinery sales and service company.	Manager, Service Dept. (whlse.trade)(187.168)
064	Office manager for farm machinery sales and service company.	Manager, Office(any ind) (169.168)
081	General Director of feed and livestock supply company.	Manager, Store(ret.trade) (185.168)
083	General Director of feed mill, farm supply store, and farm machinery sales and service.	Superintendent, grain elevator(grain & feed mill) (529.138) Manager, Store(ret. trade) (185.168)
084	General Director of grain elevator and farm supply store.	Superintendent, grain elevator(grain & feed mill) (529.138) Manager, Store(ret.trade) (185.168)

BJT Code	Occupational Titles Defined In Morehead State University Study	Dictionary of Occupational Titles, Third Edition, 1965
086	General Director and mill operator for feed and farm supply store.	Superintendent, grain elevator (grain & feed mill) (529.138) Manager, Store(ret.trade) (185.168)
087	General Director for feed and coal distribution company.	Manager, Store(ret.trade) (185.168)
092	Millman for feed mill.	Miller, Foreman(grain & feed mill)(521.782)
095	Truck driver and helper for feed mill, grain elevator, farm implement, fertilizer, and livestock supply store.	Truck driver, Heavy (any ind)(905.883)
101	Maintenance man for feed mill and grain elevator.	Millwright(any ind) (638.281)
102	Mechanic for feed mill, farm and dairy supply company.	Maintenance man(any ind) (899.381)
103	Seed cleaning and inspection foreman for seed company.	Foreman, feed mill(grain & feed mill)(529.132)
109	Salesman for feed mill and farm supply store.	Salesman, grain & feed products(whlse.tr.)(262.358) Salesman, tractor and farm implements(ret.tr.)(277.358)
114	Clerk in feed mill and farm supply store.	Sales clerk (ret. trade) (290.478)
120	Outside foreman for grain elevator, feed mill, garm supply and farm machinery sales company.	Fieldman, (any ind) (180.118) Superintendent, production (agric.)(180.168)
127	Warehouseman for feed mill, farm supply, fertilizer, and lumber company.	Stores laborer,(any ind) (922.887)
137	Director of general farm supply and service company.	Manager, Store(ret. trade) (185.168)

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146	General Director of hardware store and feed mill.	Manager, Store(ret. trade) (185.168)
		Superintendent, grain elevator(grain & feed mill) (529.138)
147	General Director and manager of tobacco warehouse company.	Manager, Tobacco warehouse (whlse.tr.)(185.168)
149	General manager real estate company.	Manager, property(real estate)(186.168)
170	Salesman in feed and farm supply store.	Salesman, grain and feed products(whlse. trade) (262.358)
		Salesman, farm and garden supplies(whlse.tr.)(277.358)
180	Office worker in tobacco warehouse company.	Clerk, general(clerical) (209.588)
195	General worker in farm supply and service company.	Laborer, Stores(any ind) (922.887)
196	Weighman and general worker in a tobacco warehouse company.	Laborer, Stores(any ind) (922.887)
		Hogshead weigher(tobacco) (224.487)
206	General Director of vegetable producing company.	Wholesaler(whlse. trade) (185.168)
207	General Director of wholesale vegetable produce and sales company.	Wholesaler(whlse. trade) (185.168)
208	General Director of retail florist shop.	Manager, retail florist (ret. trade)(185.168)
209	General Director of landscaping, florist, and greehouse business.	Manager, retail florist (ret. trade)(185.168)
		Nurseryman(agric.) (406.168)
210	General Director of florist and greenhouse business.	Manager, retail florist (ret.trade)(185.168)

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		Nurseryman (agric.) (406.168)
237	Clerk and bookkeeper for nursery and florist shop.	Bookkeeper (clerical) (210.388)
		Sales clerk(ret. trade) (290.478)
263	Floral designer.	Floral designer(ret.trade) (142.081)
264	Deliveryman for retail florist shop.	Deliveryman (any ind) (919.883)
265	Worker in wholesale vegetable produce company.	Production helper(food prep.,NEC)(529.886)
266	Worker in vegetable producing company.	Production helper(food prep.,NEC)(529.886)
267	Worker for landscaping and greenhouse business.	Nursery worker (agric.) (406.887)
276	Office director or branch manager for wholesale and retail dairy products, meat, and grocery company.	Manager, Office(any ind) (169.168)
		Manager, branch(any ind) (183.118)
278	General Director for livestock marketing cooperative.	Supervisor of Sales (bus. ser.)(185.158)
279	General Director of livestock auction company.	Auctioneer(ret. & whlse. trade)(294.258)
		Supervisor of Sales (bus. ser.)(185.158)
282	General Director and distributor for wholesale and retail dairy products, meat and grocery company.	Production Superintendent (any ind)(183.118)
		Manager, Store(185.168)
283	General Director of ice-cream and dairy products company.	Manager, Store(ret.trade) (185.168)
284	Office director of livestock marketing cooperative.	Manager, Office(any ind) (169.168)

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291	Truck driver for livestock marketing and auction company.	Truck driver, Light (any ind)(906.883) Truck driver, Heavy (any ind)(905.883)
292	Truck driver for dairy products, meat, and grocery company.	Truck driver, Heavy (any ind)(905.883)
293	Bottling machine operator for dairy products company.	Dairy processing equipment operator (dairy prod.) (529.782)
301	Freezer inspection man for dairy products company.	Dairy tester (agric.) (469.381)
311	Route salesman for wholesale and retail dairy products,meat,and grocery company.	Salesman, foodstuffs (whlse.tr.)(262.358)
312	Waitress of ice-cream dairy bar.	Car hop(Hotel and Rest.) (311.878)
322	Bookkeeper in livestock sales company.	Bookkeeper (clerical) (210.388)
342	Contact man for livestock auction company.	Salesman, livestock (whlse.tr.)(261.258)
343	Yardman for stockyard and feeder cattle business.	Livestock, caretaker, yard-or-in-transit (any ind)(466.887)
344	Grader for livestock cooperative.	Grader, meat(slaugh. and meat packing)(525.387)
345	Weighman in livestock sales company.	Weighman (any ind) (525.387)
359	General Director for wholesale and retail egg buying and grading company.	Production Superintendent (any ind)(183.118)
366	Plant process man for poultry processing company.	Poultry dresser(agric., slaugh. and meat pack.) (525.887)
380	Salesman for egg, poultry, poultry processing company.	Salesman, foodstuffs (whlse.tr.)(292.358)

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407	Hatchery operator and breed selection man for poultry company.	Poultry breeder (agric.) (412.181)
		Manager, hatchery(agric.) (412.168)
410	Truck driver and pick-up man for wholesale-retail egg company.	Truck driver, Light (any ind)(906.883)
411	General worker in egg and poultry processing company.	Farm hand, poultry (agric.)(412.884)
423	General Director for fertilizer, and lime stone company.	Manager, Store (ret.tr.) (185.168)
511	General Director of fuel distribution and service company.	Superintendent, pipe lines (184.168)
512	General Director for insurance company.	Manager, Insurance(any ind) (186.118)
513	General Director of hardware, electrical and building supply, paint, and wallpaper company.	Manager, Store (ret.trade) (185.168)
514	General Director of restaurant and liquors store.	Manager, retail liquor (ret. trade)(185.168)
516	General Director of pest control company.	Exterminator supervisor (bus. ser.)(389.138)
517	Service director of pest control company.	Manager, Service Dept. (whlse.tr.)(187.168)
519	General Director of show and riding academy, horse farm and hospital.	General manager, farm (agric.;whlse.trade) (180.168)
		Superintendent, hospital (med. service)(187.118)
521	General Director of rural grocery and variety store.	Manager, Store(ret.trade) (185.168)
522	General Director of grocery store.	Manager, Store(ret.trade) (185.168)
523	General Director of slaughter and meat processing company.	Production superintendent (any ind)(183.118)

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528	General Director of service station, tractor and truck repair shop.	Garage foreman(auto ser.) (620.131) Manager, Service (auto. ser.)(185.168)
530	Director, farm management store.	Manager, farm (agric.) (180.168) Manager, Service (auto. ser.)(185.168)
533	Director retail meat and grocery store.	Manager, Store (ret.trade)(185.168)
536	Sales manager for hardware, electrical, plumbing and building supply store.	Manager, Sales(ret.tr.& whlse. tr.)(185.168)
539	General manager of public utilities and fuel distribution company.	Dispatcher, chief(petrol, production,petrol.,refin., pipe lines) I (184.168)
540	General Director of state police district station.	Commanding officer auto. section(gov.ser.)(375.168)
564	Maintenance man in state park.	Park worker (gov. ser.) (407.887)
584	Shipping manager for hardware, building, plumbing, and electrical supply company.	Receiving & shipping foreman(any ind)(223.138)
596	Life insurance agent.	Life underwriter (ins.) (250.258)
597	Salesman in pest control company.	Salesman, pest control company(service)(252.358)
601	Sales manager for insurance company.	Manager, Insurance(any ind) (186.118)
612	Clerk for grocery and variety store.	Stores clerk (223.387)
613	Sales clerk and bookkeeper in retail meat store and meat processing company.	Sales, clerk (ret.trade) (290.478) Bookkeeper (clerical) (210.388)

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614	Clerk in feed mill.	Salesman, grain & feed products(whlse.tr.)(262.358)
616	Cashier in grocery store and bank.	Bank cashier in bank. (186.168)
		Cashier and wrapper (ret.trade)(211.468)
624	Produce and meat manager in grocery-supermarket.	Supervisor of stock (clerical)(223.138)
631	Route serviceman for pest control company.	Salesman, pest control service(bus.ser.)(252.358)
632	Meat cutter for supermarket.	Meat cutter(ret. & whlse. trade)(316.884)
633	Butcher for frozen food locker and meat processing company, including sausage making and boning.	Butcher(all around-slaugh. and meat pack.)(525.381)
		Laborer(slaugh. & meat pack.)(529.887)
634	Caretaker in show and riding academy, including horse trainer on horse farm.	Caretaker, farm (agric.) (421.884)
		Horse trainer(amus.&rec.) II (159.228)
636	Claims adjuster for insurance company.	Claims adjuster (insurance) (241.168)
637	Foreman for horse rehabilitation farm and horse hospital.	Director, hospital (med. ser.)(187.118)
		Horse trainer,(amus.&rec.) I (153.228)
639	Conservation instructor in 4-H camp.	Four-H club agent (education)(096.128)
641	Exercise boy and groom boy for horse rehabilitation farm and horse hospital.	Stableman(any ind) (356.874)
644	Produce man in supermarket-grocery store.	Salesman, food products (ret.trade)(262.358)

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647	Naturalist in State Park.	Park naturalist(gov.ser.) (099.228)
661	General Director for heating and plumbing company.	Manager, Store(ret.trade) I (185.168)
679	General Director of ready mix concrete and concrete block company.	Manager, retail lumber & building supplies(185.168)
681	General Director of garage and service station.	Service manager(auto.ser.) (185.168)
		Garage foreman(auto.ser.) (620.131)
682	General Director and district distributor in petroleum bulk plant.	Industrial distributor (whlse.tr.)(185.168)
683	General Director of motor company.	Superintendent,transportation(any ind)(184.168)
		Manager, retail automotive (ret.trade)(185.168)
688	Agent for insurance company.	Agent(insurance)(250.258)
698	General Director for nursing home.	Superintendent, home-for-aged(any ind)(187.118)
770	Service station attendant and automobile mechanic.	Automobile-service mechanic (auto. ser.) I (620.381)
777	Serviceman for furnace company.	Oil burner-installation and serviceman(any ind) (862.281)
779	Plumber for plumbing company.	Plumber, maintenance(any ind)(862.381)
780	Electrician for plumbing company.	Electrician (any ind) (824.281)
831	Plant foreman for stone and concrete block company.	Concrete batching and mixing plant foreman(constr.) (570.132)
832	Product salesman and office manager for stone company.	Manager, Office (any ind) (169.168)

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857	Custodian for public school system, state park, church, hotel, nursing home, and department store.	Janitor (any ind) I (382.884)
865	Cook for camp, school, restaurant, or nursing home.	Cook, head, school cafeteria (hotel and rest.)(313.138) Cook (hotel and rest.) (313.381)
882	Field service worker for health department.	Health officer, field (gov. ser.)(168.168)